REMARKS

Review and reconsideration of the Office Action of December 28, 2004 is respectfully requested in view of the above amendments and the following remarks.

Applicants appreciate the indication of allowability of claim 19. Claim 19 is presented in independent form. Indication of allowance of claim 19 is respectfully requested.

Regarding the new rejection of the remaining claims over the new reference (Kakinamie et al), Applicants respectfully submit that present claim 1 clearly distinguishes over this reference, thus reconsideration is respectfully requested.

Turning now to the Office Action, the paragraphing of the Examiner is adopted.

Claim Rejections - 35 USC § 112

1. Referring to claim 2, the Examiner finds the claim to be unclear as to whether to consider the limitation in the parenthesis as a part of the claim. The Examiner also rejects claims 3-11, 17-18 and 21-24 as being dependent upon claim 2 or for the same reason given in claim 2.

In response, Applicant consistently deletes the terms in parenthesis from the claims, and amends the term "pixel" to use only "image point" throughout the claims.
Withdrawal of the rejection is respectfully requested.

2. The Examiner indicates that the phrase "and/or" recited in claims 3, 5, and 21 renders the claims indefinite.

In response, the claims have been revised to remove this term.

Claim Rejections - 35 USC §102

Claims 1-6, 9-11, 13-14, 15-18 and 20-22 are rejected under 35 U.S.C §102(e) as being anticipated by Kakinami et al. (U.S. Patent No. 6,205,234 B1).

Applicants respectfully traverse. Applicants do not understand the relevance of this reference.

As set forth in claim 1, the present invention concerns a simple and eloquent - that is - low computation power - process for recognition of vehicle lane markings from image data, comprising evaluating morphological characteristics of vehicle lane markings using *a priori* knowledge, and using a matched-filter in order to extract image points, which are associated with vehicle lane markers, by the specific recited process involving:

measuring the **average gray value of the background** in the environment of the position to be examined, and

evaluating an image point, which is potentially to be associated with the vehicle lane marking, on the basis of a comparison between **background noise, the average gray value in the environment, and a gray value of the position to be examined.**

Kakinami et al neither use or determine average gray value, nor suggest the above recited simplified process.

The type of recognition practiced in Kakinami et al is rather complex. Kakinami et al extract edge information from the image data from the camera in order to find therein boundaries of traffic lane markers (col. 4, lines 20-25). One

of the simplest (one could say primitive) types of edge detection is the use of a Sobel-Operator, as mentioned in col. 5, lines 1 on. The Sobel operator performs a simple 2-D spatial gradient measurement on an image and so emphasizes regions of high spatial frequency that correspond to edges. Typically it is used to find the approximate absolute gradient magnitude at each point in an input grayscale image.

In Fig. 7 and associated text an intensity scan within the original image, and thereunder the gradient image as obtained by means of the Sobel operator, is shown. At those locations in the image data, where the dark image data corresponding to the surface of the street change to the light image data corresponding to lane markers, the greatest change in gradient is seen (edge zone Z1 and Z2). Within the image of the street surface or, as the case may be, the lane marker, the image data is homogeneous, so that the gradient is (or appears to be in the simplified illustration) approximately zero.

It would appear that the Examiner, attempting to compare the present claims with the disclosure of Kakinami et al, compares is comparing this null-line of the gradient curve in the gradient image as depiction of the average gray value in this image area (Office Action, page 4). This is technically incorrect. It would follow from this interpretation that the image of the street surface and the image of the lane marker would have the same average value. This however, as can be seen from the image density plot, does not make sense technically.

In contrast to Kakinami et al, in the present invention no heavy computation is involved preparing data in the sense of

edge detection, but rather, the lane marker containing image data is simply evaluated for background noise, the average gray value of the environment, and the gray value at the image position being examined. This peculiarity of the present invention is expressed in claim 1.

Further, Applicants previously pointed out that the present invention used a **matched filter** (Fig. 4 and associated text), while the prior art used **template matching** (which required a large library of "views") for each design of lane marker being searched for. The term "matched filter" does not appear in Kakinami et al.

Accordingly, withdrawal of the rejection is respectfully requested.

Claim Rejections - 35 USC § 103

Claims 7-8 (Kalman filter) are rejected under 35 U.S.C. §103(a) as being unpatentable over Kakinami et al. (U.S. Patent No. 6,205,234 B1).

Applicants respectfully submit that these claims are allowable by virtue of their dependency from allowable claims.

Allowable Subject Matter

Claim 19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office Action and to include all of the limitations of the base claim and any intervening claims.

In response, Applicants render claim 19 in condition for allowance by incorporating claims 1, 17 and 18 into claim 19. No

additional independent claim fees are required.

As there are no further rejections, favorable consideration and early issuance of the Notice of Allowance is respectfully requested. Should any points remain that the Examiner considers may be addressed by telephone, the Examiner is requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Stephan A. Pendorf
Registration No. 32,665

PENDORF & CUTLIFF
P.O. Box 20445
Tampa, Florida 33622-0445
(813) 886-6085

Date: March 28, 2005

CERTIFICATE OF MAILING AND AUTHORIZATION TO CHARGE

I hereby certify that the foregoing AMENDMENT B for U.S. Application No. 09/704,366 filed November 01, 2000, was deposited in first class U.S. mail, postage prepaid, addressed: Attn: Mail Stop: Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on **March 28, 2005.**

The Commissioner is hereby authorized to charge any additional fees, which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account No. 16-0877.

Stephan A. Pendorf